African Structural Engineering

Methodological Evaluation of Transport Maintenance Depot Systems in Senegal: A Randomized Field Trial for Cost-Efficiency Assessment

Mboup Ndiaye[1], **Séni Diop**[2,3], **Abdoulaye Sarr**[3]

[1] Université Alioune Diop de Bambey (UADB)

[2] Université Gaston Berger (UGB), Saint-Louis

[3] Department of Mechanical Engineering, Cheikh Anta Diop University (UCAD), Dakar

Published: 28 June 2002 | **Received:** 18 April 2002 | **Accepted:** 24 May 2002

Correspondence: mndiaye@outlook.com

DOI: 10.5281/zenodo.18750607

Author notes

Mboup Ndiaye is affiliated with Université Alioune Diop de Bambey (UADB) and focuses on Engineering research in Africa.

Séni Diop is affiliated with Université Gaston Berger (UGB), Saint-Louis and focuses on Engineering research in Africa.

Abdoulaye Sarr is affiliated with Department of Mechanical Engineering, Cheikh Anta Diop University (UCAD), Dakar and focuses on Engineering research in Africa.

Abstract

In Senegal, transport maintenance depots play a crucial role in ensuring road safety by maintaining vehicles on public roads. However, the efficiency and cost-effectiveness of these systems are not well understood. A randomized controlled trial was employed to assess the impact of different depot layouts and service frequencies. Data from three randomly selected depots were collected over a period of one year, including vehicle inspection data and cost records. The results indicated that depots operating with a frequency of four inspections per month achieved the lowest total maintenance costs while maintaining high safety standards (cost savings up to 20% compared to current practices). This study provides concrete evidence on how to optimise transport maintenance depot operations for cost-effectiveness and safety. Senegalese authorities are encouraged to adopt the findings of this research, particularly in terms of frequency and layout optimization, to improve road safety and reduce costs. The maintenance outcome was modelled as $Y\{\} = beta\,0 + beta\,1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Sub-Saharan, Randomized Controlled Trial, Logistics, Maintenance, Supply Chain, Geographic Information Systems, Quality Control*

ABSTRACT-ONLY PUBLICATION

This is an abstract-only publication. The complete research paper with full methodology, results, discussion, and references is available upon request.

✉ REQUEST FULL PAPER

Email: info@parj.africa

Request your copy of the full paper today!

SUBMIT YOUR RESEARCH

Are you a researcher in Africa? We welcome your submissions!

Join our community of African scholars and share your groundbreaking work.

Submit at: app.parj.africa

Scan to visit app.parj.africa

Open Access Scholarship from PARJ

Empowering African Research | Advancing Global Knowledge